

## CLAIMS

What is claimed is:

1. A method for manufacturing a semiconductor device using an oxide sacrificial material, comprising the step of etching the oxide sacrificial material using an etching solution comprising hydrofluoric acid (HF) and sulfuric acid (H<sub>2</sub>SO<sub>4</sub>).
2. The method of Claim 1 wherein the semiconductor device comprises a plurality of deposited and patterned layers, including at least one polysilicon layer.
3. The method of Claim 2 wherein at least one of the plurality of deposited and patterned layers is a metal layer comprising aluminum.
4. The method of Claim 3 wherein the etching solution has an etch selectivity for the oxide sacrificial material relative to the metal layer of greater than 100.
5. The method of Claim 1 wherein the semiconductor device comprises a micromechanical device, a microelectromechanical device or a microfluidic device.
6. The method of Claim 1 wherein the step of etching the oxide sacrificial material is performed with the etching solution at a temperature in the range of 5 - 70 °C.
7. The method of Claim 1 wherein the hydrofluoric acid comprises a "semiconductor grade" hydrofluoric acid, and the sulfuric acid comprises a "semiconductor grade" sulfuric acid.
8. The method of Claim 1 wherein the hydrofluoric acid comprises at least 40 - 50% by weight HF.
9. The method of Claim 1 wherein the sulfuric acid comprises at least 90% by weight H<sub>2</sub>SO<sub>4</sub>.
10. The method of Claim 1 wherein the HF and H<sub>2</sub>SO<sub>4</sub> are present in the etching solution in a ratio HF:H<sub>2</sub>SO<sub>4</sub> ranging from 1:1 to 3:1.

11. An etch composition useful for removing an oxide sacrificial material from a semiconductor device, comprising a solution of hydrofluoric acid (HF) and sulfuric acid ( $\text{H}_2\text{SO}_4$ ), with the hydrofluoric acid further comprising at least 40% by weight HF.
12. The etch composition of Claim 11 wherein the HF and  $\text{H}_2\text{SO}_4$  are present in the solution in a ratio HF: $\text{H}_2\text{SO}_4$  ranging from 1:3 to 3:1.
13. The etch composition of Claim 11 wherein the HF comprises a "semiconductor grade" HF, and the  $\text{H}_2\text{SO}_4$  comprises a "semiconductor grade"  $\text{H}_2\text{SO}_4$ .
14. The etch composition of Claim 11 wherein the HF comprises 40 - 50% by weight HF.
15. The etch composition of Claim 14 wherein the  $\text{H}_2\text{SO}_4$  comprises at least 90% by weight  $\text{H}_2\text{SO}_4$ .
16. The etch composition of Claim 11 wherein the semiconductor device includes at least one layer of polysilicon or silicon nitride.
17. The etch composition of Claim 16 wherein the semiconductor device further includes at least one metal layer comprising aluminum.
18. The etch composition of Claim 11 wherein the semiconductor device comprises a micromechanical device, a microelectromechanical device or a microfluidic device.